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TA-53 Standard
Determination of Unreviewed Safety Issues

53 FMS 114-02.01

Effective date: September 3, 1996

APPROVALS

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TA-53 FACILITY MANAGEMENT STANDARD	DETERMINATION OF UNREVIEWED SAFETY ISSUES	53 FMS 114-02.01 Effective 9/3/96 Page 3 of 10
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1.0 Introduction

DOE Order 5480.25, *Safety of Accelerator Facilities*, establishes requirements for Unreviewed Safety Issues (USIs) that are parallel and similar to the requirements for Unreviewed Safety Questions (USQs) for nuclear facilities given in DOE 5480.21. LS 114-01, *Unreviewed Safety Question Determination*, describes the Laboratory's process for USQDs, which is derived from DOE 5480.21.

2.0 Purpose

The purpose of this standard is to implement the requirements of DOE 5480.25 by providing guidance for performing, documenting, and approving USI screenings and USI determinations (USIDs) for TA-53 activities. The purpose of the USID process is to allow the contractor the flexibility to make certain changes without prior DOE approval as long as these changes do not explicitly or implicitly affect the authorization basis of the facility or result in a safety envelope change. The USID process also determines whether a USI exists and thus indicates when DOE approval of a change is required. The USID process does *not* determine the safety of a given situation but rather identifies changes that may exceed the established safety envelope or affect accepted risk factors.

Note: The USI screening and USID procedure should be reserved for “technically significant” changes and existing conditions. The term *technically significant change* refers to a proposed change that could potentially exceed the bounding accident analysis and/or approved safety envelope.

3.0 Scope

Note: LS 114-01, *Unreviewed Safety Question Determination*, applies to any nuclear activities/facilities at TA-53.

3.1 **General.** USIDs are evaluated against approved authorization basis documents. USID preparers should follow a “graded approach” with respect to content of documentation and depth of analysis. This standard applies to:

- all TA-53 accelerators and accelerator facilities that use safety documentation, including SADs, PHAs, SAs, or other similar records and analyses as their authorization basis for operation;
- organizations responsible for design, engineering, maintenance, inspection, or operation of an accelerator facility;
- changes at TA-53 accelerator facilities that may affect the consequences or probability of hazardous materials and radiological accidents;
- changes to an accelerator facility that explicitly or implicitly affect the authorization basis of that facility or experiments conducted therein;

- changes to any accelerator facility that alter the design, function, or method of performing the function of a structure, system, or component described in the safety analyses and relied on to maintain the established safety envelope.

3.2 Exclusions. The following do not require a USID (also see 7.2.2):

- Routine maintenance activities, unless these activities are not assumed in current safety analyses or have the potential for violating a safety envelope. Routine maintenance includes removal and replacement of shielding for access purposes, providing that configuration controls exist to ensure proper replacement of shielding. "Like-for-like" component replacements are considered routine maintenance.
- Routine modifications to experimental caves or stations, providing the modifications are subject to safety review and approval by the responsible TA-53 organization(s) and do not have the potential for violating a safety envelope.
- Significant upgrades or modifications for which a safety analysis must be performed. These need not be subject to the USID process, providing that the safety analysis considers the impact on existing operating and safety envelopes and the acceptability of the change is documented.
- "Inconsequential" changes.

4.0 Definitions and terms

inconsequential A change that has no impact on safety, such as editorial changes to a procedure or authorization basis document.

safety assessment document (SAD) A report prepared to meet the requirements of DOE 5480.25 which contains the results of a safety analysis for an accelerator facility pertinent to understanding the risks of the proposed undertaking.

safety envelope The set of physical and administrative conditions that define the bounding conditions for safe operation at an accelerator facility.

screen a series of questions which, if all are answered in the negative, indicate that a USI determination (answering the six questions on the USID Screening and Worksheet form) need not be performed.

unreviewed safety issue (USI) A condition that exists if a potentially inadequate safety analysis is discovered or if a proposed change, modification, or experiment will:

- significantly increase the probability of occurrence (through reduction in the margin of safety or otherwise) or the consequences of an accident or

malfunction of equipment important to safety from that evaluated previously by safety analysis; or

- introduce an accident or malfunction of a different type than any evaluated previously by safety analysis which could result in significant safety consequences.

unreviewed safety issue determination (USID) a process (and the document) that considers the impact of a proposed change or existing condition to determine if an unreviewed safety issue exists.

5.0 Responsibilities

Who?	Responsibility
Line Manager or designee	<ul style="list-style-type: none">• Perform initial screening and/or USID to determine if a USI exists.• Submit USIDs and screens to the Facility Manager for approval.• Notify the TA-53 Facility Manager as soon as possible of any conditions involving potentially inadequate safety analysis or a possible violation of a safety envelope.• Ensure that appropriate personnel are trained to prepare and approve screens and USIDs.
Independent Reviewer	<ul style="list-style-type: none">• Review USIDs for which all six questions must be answered.
TA-53 Facility Manager or designee	<ul style="list-style-type: none">• Approve screens and USIDs for TA-53 accelerator activities.• Submit positive USIDs to ESH-3 for coordination of DOE approval.• Maintain records of TA-53 USIDs and screens.• Submit changes to safety envelopes to ESH-3 for coordination of DOE approval.
ESH-3	<ul style="list-style-type: none">• Coordinate DOE approval of positive USIDs and safety envelope changes.

6.0 Precautions and Limitations

- 6.1 DOE 5480.25 requires that activities that involve an unreviewed safety issue (positive USID) **not be performed** without prior DOE approval.
- 6.2 Nuclear activities or facilities at TA-53 are subject to the USQD process as described in LS 114-01.

7.0 Standard Requirements

- 7.1 Initial Review. Under the following conditions, documentation by notation may be sufficient. Though documentation through the USID process is not required, such changes may need to be included in updates to the SAD.

- "inconsequential "changes
- changes which have been addressed by a prior USID or screening
- specific exclusions for activities that do not impact safety and that are approved by line and facility management and DOE

7.2 Screening/Entry Conditions. A screening process is used to determine whether a USID safety evaluation (answering all six questions on the USID and Screening Worksheet) is required. A USID is required if any of the following conditions apply:

7.2.1 Revisions to the bases of the safety envelope. SAD revisions that might result in changes to the safety envelope must be considered. If it is known that the safety envelope will be revised, DOE approval is required and the USID process is not necessary.

7.2.2 Changes to the accelerator facility. This should be interpreted to mean alterations to the design, function, or method of performing the function of a structure, system, or component described in the safety analysis and relied on to maintain the approved safety envelope. Examples are changes to shielding, air exhaust systems, and access control systems. The following are not considered changes to the facility:

- maintenance activities that do not meet the aforementioned criteria;
- physical changes that do not meet these criteria, including simple relocation of barriers, providing that documentation demonstrating no significant increase in consequence or probability of an accident or malfunction of equipment important to safety exists prior to a potential hazard exposure;
- if the safety envelope is based on an operational condition, temporary changes during non-operational periods where the original configuration will be restored and verified by readiness review before operations resume.

7.2.3 Changes in procedures. This should be interpreted to mean changes in procedures, processes or methods of operation described in the safety analysis and relied on to maintain the approved safety envelope. Examples are changes to exclusion area access control procedures or changes in the frequency of interlock tests. Minor changes, such as editorial or non-safety-related revisions, can be considered inconsequential.

7.2.4 Conduct of special tests or experiments. This should be interpreted to mean types of tests or experiments (including user experiments) not generally described in the safety analysis and which might degrade margins of safety or degrade the adequacy of structures,

systems, or components relied on to maintain the approved safety envelope. Examples are beam spill tests or experiments with hazardous materials not described in the safety analysis.

7.2.5 Inadequate safety analysis. Discovery of new information, analytic errors, discrepant as-found states, omissions, or other inadequacies in the safety analysis. In this case, screening does not apply and all six USID questions must be answered. Situations involving potentially inadequate safety analysis shall be reported to the TA-53 Facility Manager as soon as possible. New analysis results due to advances in analytical capability are not an indication of inadequate safety analysis.

7.3 Changes to the safety envelope. If a change to a safety envelope statement is not inconsequential, the Facility Manager shall provide the change, along with any revisions to the SAD, to ESH-3 for coordination of DOE approval.

7.4 Safety envelope violations and discrepant conditions

7.4.1 Determination of safety envelope violations and reportability shall be based on safety envelope statements in an approved SAD and criteria in the LANL *Occurrence Investigating and Reporting Manual*, respectively.

7.4.2 If a significant safety-related discrepancy between the facility and a safety envelope statement is discovered,

- the situation shall be made safe,
- the facility manager shall be notified as soon as possible, and
- a USID shall be performed.

Note: If a safety-related discrepancy between the facility and the safety analysis is discovered it should be documented, but does not require a USID *providing that* it (1) can be readily corrected, (2) causes no undue hazard exposures, and (3) does not require revisions to the safety envelope. An example is the discovery by an RCT of a "hot spot" which is mitigated by a physical barrier or added shielding.

7.5 Guidance on addressing the six USID questions. See the USID and Screening Worksheet (attached).

Question 1: The proposed change must be compared with the basis for the probabilities in the SAD or other safety documentation constituting the authorization basis. If the proposed change results in an increase in probability from one frequency class to a higher frequency class (e.g., unlikely to likely) or greater than an order of magnitude within a frequency class, the answer would be "yes." Qualitative estimates are acceptable, but rationale must be provided.

The margin of safety, though perhaps not explicitly defined in an SAD, may be implicit in the difference between acceptable operating limits and the safety envelope.

Question 2: A potential increase in consequences shall be evaluated by comparing the anticipated consequences of an accident with the consequences of a same or similar "family" of accident that has already been analyzed. If the potential consequences increase beyond those of the bounding accident of that family, the answer is "yes." Examples of *different* families of accidents are prompt radiation exposure, exposure to radioactive materials, fires, and electrical hazards.

Question 3: Accident analyses often involve calculated or assumed failure of one or more systems important to safety. Other independent systems important to safety may be assumed to function normally and may even mitigate the severity of the accident. If a proposed change either degrades the performance of these systems or increases the challenges to these systems, the probability will increase that equipment important to safety will malfunction.

See question 1 guidance regarding margin of safety.

Question 4: This question evaluates changes that affect equipment and thereby potentially increase releases of hazardous material or energy and/or radioactive doses above the worst-case limiting consequences in the safety analysis. Fundamental to this process is evaluating equipment that is important to safety in relation to the change. Credible failure modes identified in the safety analysis should be used in this evaluation.

Question 5: An accident involving an initiator or failure that is not considered in the safety analysis is potentially an "accident of a different type." An accident that may be "different" but involves a smaller accident consequence than that already addressed in the safety documentation should not be considered an accident of a different type, unless the contribution of the accident causes the bounding case to be exceeded. Accidents of a different type are limited to those considered as likely to happen as those considered in the authorization basis.

Question 6: Malfunctions involving equipment not covered by the original safety analysis constitute a "malfunction of a different type," as do malfunctions not predicted by the safety analysis.

<p>Note: Malfunctions that may be considered "different" but are bounded by the existing accident analysis are not considered "malfunctions of a different type." Possible malfunctions of a different type are limited to malfunctions that are considered as likely to happen as those considered in the authorization basis.</p>
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7.6 Review and Approval

7.6.1 The TA-53 Facility Manager must approve all USIDs and screens at TA-53. This responsibility may be delegated to TA-53 ES&H

Team Leader or other persons designated in writing. USID worksheets on which the answers to all screening questions (section 4) are "no" require approval by the TA-53 Facility Manager but do not require a reviewer signature.

- 7.6.2 Any change resulting in an Unreviewed Safety Issue (positive USID) must be approved by DOE before initiating the change. The TA-53 Facility Manager will forward positive USIDs to DOE for approval. Unimplemented changes or alternative solutions not involving a positive USID or safety envelope change do not require DOE approval.

7.7 Personnel Qualifications

- 7.7.1 Personnel involved in preparing, reviewing, or approving a USID or screen must be familiar with this standard and with the approved authorization basis documentation and relevant safety analyses. Persons performing, reviewing, or approving USIDs should be familiar with the facility and its operations and complete the Laboratory's USQD awareness course. The DOE USQD course is strongly recommended for reviewers and is suggested for preparers and approvers.

- 7.7.2 Reviewers should be independent of (not involved with or responsible for) the activity in question. Suggested independent reviewers for TA-53 USIDs include members of the Radiation Safety Committee or the LANSCE Operations Safety Committee, other TA-53 or LANL ES&H-related committees, the staff of the TA-53 facility management team (including ESH-1 and ESH-5), or members of the accelerator community having appropriate expertise.

8.0 Required Records

Note: Complete justification must be provided for all responses entered on the USID Worksheet. "Yes" or "no" answers must be supported, and relevant drawings, calculations, or analyses must be referenced or attached.

- 8.1 A completed USID and Screening Worksheet with appropriate review/approval signatures is required for all changes that necessitate a USID or screening. A standard form (Attachment 1) is available in electronic form from the TA-53 Facility Management office.
- 8.2 USID evaluation/screening document numbers (first block of the form) should be written in the following format: **53-YR-XX**, where YR is the last two digits of the year and XX is a sequential number issued by the TA-53 facility management office.
- 8.3 The facility management organization shall retain copies of approved USID worksheets for the life of the facility. These records will be transferred to any subsequent organization or contractor.

TA-53 FACILITY MANAGEMENT STANDARD	<i>DETERMINATION OF UNREVIEWED SAFETY ISSUES</i>	53 FMS 114-02.01 Effective 9/3/96 Page 10 of 10
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- 8.4 Any changes resulting from a USID must be incorporated into the existing SAD or other authorization basis documents.

9.0 References (refer to the most current version)

- LS 114-01, *Unreviewed Safety Question Determination*
- DOE 5480.25, *Safety of Accelerator Facilities*
- *Guidance for an Accelerator Facility Safety Program*